REMARKS/ARGUMENTS

The Applicants have carefully considered this application in connection with the Examiner's Action and respectfully request reconsideration of this application in view of the following remarks.

The Applicants originally submitted Claims 1-20 in the application. In a previous response to an Election Requirement, the Applicants elected Group II, constituting Claims 1-10 and 16-20. Presently, the Applicants have not amended, cancelled nor added any claims. Accordingly, Claims 1-10 and 16-20 are currently pending in the application.

I. Rejection of Claims 1-6, 10, 16 and 20 under 35 U.S.C. §103

The Examiner has rejected Claims 1-6, 10, 16 and 20 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,750,133 to Datta ("Datta") in view of U.S. Patent No. 5,814,238 to Ashby, *et al.* ("Ashby"). Independent Claims 1 and 16 currently include the element of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer. Neither Datta nor Ashby alone teaches or suggests this claimed element.

Datta is directed to a selective ball-limiting metallurgy etching process for fabrication of electroplated tin bumps. (Title) Datta teaches that a copper seed second layer **28** located between a copper stud **34** and a metal first layer **26** is subjected to a first wet etch process such that a metal second layer **29** is formed, the metal second layer **29** being defined by the perimeter of the copper stud **34**. Datta then teaches that the metal first layer **26** located between the previously formed metal second layer **29** and a metallization **14** is subjected to a second wet etch process such that a metal first layer **27** is formed, the metal first layer **27** being defined by the perimeter of the copper stud **34**. Datta additionally teaches (actually requires) that the first and second wet etch processes be such that no significant amount of non-soluble oxide film, such as a tin oxide film, is formed during the etch formation of the metal second layer **29** or metal first layer **27**. (See Datta at Column 5, lines 60-65 and Column 6, lines 60-65, respectively). Accordingly, Datta requires that a wet etch process be used to etch its metal first layer **26** (e.g., barrier layer), and not that the etch process is a dry etch selective to the barrier layer, as is currently claimed. (See also the Examiner's Action dated February 23, 2006, wherein the Examiner concedes that Datta does not teach or suggest the use of a dry etch chemistry to etch the barrier layer).

The Examiner, however, attempts to combine the teachings of Ashby with those of Datta, such that the etch used to form the metal first layer **27** from the metal first layer **26** is a dry etch. More specifically, the Examiner asserts that it would have been obvious to one skilled in the art to exchange the dry etch of Ashby with the wet etch of Datta when forming the metal first layer **27** in Datta. The Applicants respectfully disagree with the Examiner for a number of reasons.

First, no motivation exists in Datta, Ashby or elsewhere to combine the dry etch of Ashby with the manufacturing process of Datta. It should initially be noted that Ashby teaches using an oxygen containing dry etch process to etch or otherwise define transition metals. However, Datta appears to teach away from using the oxygen containing dry etch of Ashby, because using such a dry etch on the structure of Datta would form an undesirable tin oxide. As the Applicants previously pointed out, Datta specifically states a desire to limit the formation of tin oxide. Therefore, using the dry etch of Ashby with the manufacturing process of Datta would ultimately form a tin oxide, which is squarely against the teachings of Datta. In view of this, one skilled in the art would not be motivated to combine the dry etch of Ashby with the manufacturing process of Datta. A teaching away, such as we have here, is prima facie evidence of no motivation to combine.

Second, without strong motivation otherwise, one skilled in the art would not be motivated to randomly jump between wet etch processes conducted in a wet etch chamber and dry etch processes conducted in a dry etch chamber. For example, Datta requires that a wet etch be used to etch or otherwise define the copper seed second layer **28**. As those skilled in the art are well aware, dry etches are incapable of appropriately etching the copper, thus the need for the wet etch in this initial step. Having been required to use the wet etch to etch or otherwise define this initial copper seed second layer **28**, the general desire of the manufacturer would be to again use a second wet etch within the same wet etch chamber to subsequently etch or otherwise define the metal second layer **26**, which is exactly what Datta teaches. Accordingly, without a strong motivation otherwise, and the Applicants do not think one exists, the manufacturer would not randomly jump from the first wet etch process conducted in a wet etch chamber to a second dry etch process conducted in an entirely different dry etch chamber. Such a move would be both time consuming and costly, which goes against the general desires of the semiconductor industry. Third, the Examiner has not offered any evidence, except for the general proposition that it would be obvious, that a motivation to combine the references does actually exist.

In view of three reasons set forth above (e.g., including the teaching away, the increase in time and cost associated with replacing the second wet etch with a second dry etch, as well as the Examiner's lack of evidence), if the Examiner continues to attempt to combine the teachings of Datta with those of Ashby, the Examiner is doing nothing more than use hindsight to reconstruct the presently claimed invention. Specifically, the Examiner has taken the individual elements of the presently claimed invention and gone out and found those elements in various different references, and without any motivation in either of the references, declared that it would be obvious to combine the references. The Examiner is well aware that such a combination is improper.

Thus, Datta and Ashby individually fail to teach or suggest the invention recited in independent Claims 1 and 16 and their dependent claims, when considered as a whole. Additionally, the combination of Datta and Ashby is improper. The references must therefore fail to establish a prima facie case of obviousness with respect to these claims. Claims 1-6, 10, 16 and 20 are therefore not obvious in view of Datta and Ashby.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 1-6, 10, 16 and 20 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

II. Rejection of Claims 7, 8, 17 and 18 under 35 U.S.C. §103

The Examiner has rejected Claims 7, 8, 17 and 18 under 35 U.S.C. §103(a) as being unpatentable over Datta in view of Ashby and further in view of U.S. Patent No. 4,849,124 to Backus ("Backus"). As previously indicated, independent Claims 1 and 16 currently include the element of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer. As established above, neither Datta nor Ashby teaches or suggests this claimed element. As further established above, the combination of Datta and Ashby is improper.

Backus fails to correct the deficiencies of Datta and/or Ashby. The Examiner is offering Backus for the sole proposition of etching copper using an etch chemistry including hydrogen peroxide and sulfuric acid. Without even addressing whether the Examiner's proposition is accurate, a teaching or suggestion of etching copper using an etch chemistry including hydrogen peroxide and sulfuric acid is entirely different from a teaching or suggestion of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer, as is currently claimed. Accordingly, Backus also fails to teach or suggest this claimed element.

Thus, Datta, individually or in combination with Backus, or alternatively Ashby, individually or in combination with Backus, fails to teach or suggest the invention recited in independent Claims 1 and 16 and their dependent claims, when considered as a whole. The combinations must therefore fail to establish a prima facie case of obviousness with respect to these claims. Claims 7, 8, 17 and 18 are therefore not obvious in view of the combinations.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 7, 8, 17 and 18 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

III. Rejection of Claims 9 and 19 under 35 U.S.C. §103

The Examiner has rejected Claims 9 and 19 under 35 U.S.C. §103(a) as being unpatentable over Datta in view of Ashby and further in view of U.S. Patent No. 6,569,752 to Homma, *et al.* ("Homma"). As previously indicated, independent Claims 1 and 16 currently include the element of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer. As established above, neither Datta nor Ashby teaches or suggests this claimed element. As further established above, the combination of Datta and Ashby is improper.

Homma fails to correct the deficiencies of Datta and/or Ashby. The Examiner is offering Homma for the sole proposition of a surface conductive lead having a width of about 100 μm. Without even addressing whether the Examiner's proposition is accurate, a teaching or suggestion of a surface conductive lead having a width of about 100 μm is entirely different from a teaching or suggestion of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer, as is currently claimed. Accordingly, Homma also fails to teach or suggest this claimed element.

Thus, Datta, individually or in combination with Homma, or alternatively Ashby, individually or in combination with Homma, fails to teach or suggest the invention recited in independent Claims 1 and 16 and their dependent claims, when considered as a whole. The

combinations must therefore fail to establish a prima facie case of obviousness with respect to these claims. Claims 9 and 19 are therefore not obvious in view of the combinations.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 9 and 19 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

IV. Prior Art Made of Record

The Applicants believe that the prior art made of record and not relied upon by the Examiner is not particularly pertinent to the claimed invention, but the Applicants retain the right to address these references in detail, if necessary, in the future.

V. Conclusion

In view of the foregoing amendment and remarks, the Applicants now see all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 1-10 and 16-20.

The Applicants request the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application. The Commissioner is hereby authorized to charge any fees, credits or overpayments to Deposit Account 20-0668.

Respectfully submitted,

HITT GAINES, PC

Greg H. Parker
Registration No. 44,995

Dated: April 13, 2006

P.O. Box 832570
Richardson, Texas 75083
(972) 480-8800